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National Synthesis — A Critical Component of National Assessments

Contaminants in the Nation's Drinking-Water Supply Wells

Patty Toccalino

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U.S. Department of the Interior
U.S. Geological Survey

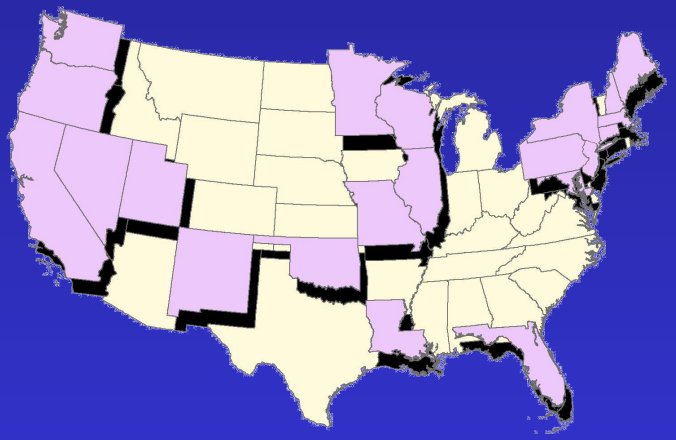
Objectives

- Parallels between USGS National Water-Quality Assessment (NAWQA) and CDC's Environmental Public-Health Tracking (EPHT) Programs
- Importance of national synthesis in NAWQA
- Select national assessment results

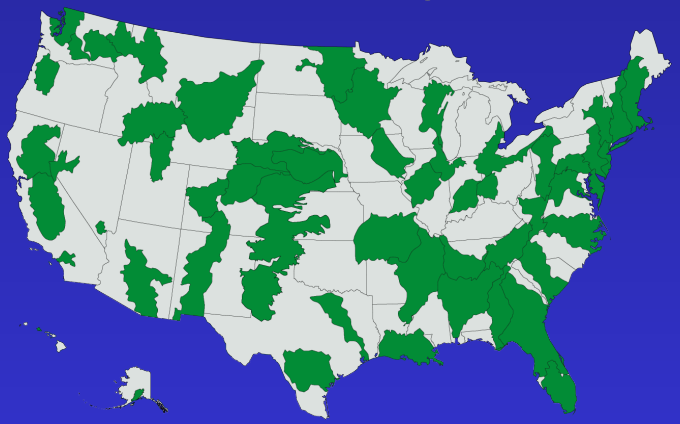
Parallels between EPHT & NAWQA programs

- National programs
- Water-quality components
- Multiple local/state-scale studies synthesized into regional/national assessments

21 States



51 Study Units



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Complementary aspects of EPHT & NAWQA

EPHT

- CDC scientists & partners are human-health specialists
- Largely reliant on existing data collected by others
- Need for water-quality data to understand relations between exposures & health effects

NAWQA

- USGS scientists are hydrologists, chemists, biologists, geographers
- Largely collects its own water-quality data
- Need for communicating water-quality findings in the context of human health

National synthesis needed to support effective water policy and management

Assessment of status & trends in local, regional, & national water quality

+

Understanding of natural & human factors affecting water quality

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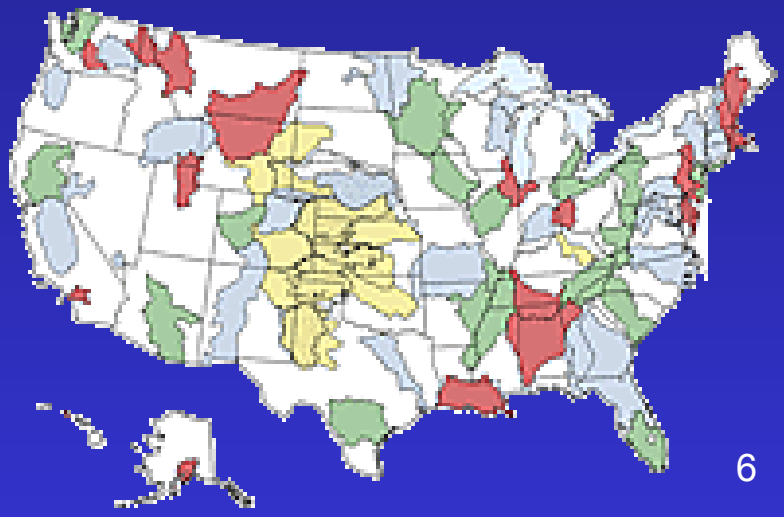
Meaningful contributions to policies & management practices to improve water quality

NAWQA design ensures comparable results

- Nationally consistent design
  - Assessment of ambient water resources
  - Wide range of hydrologic & land-use settings
- Uniform sampling & analytical methods across study units



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NAWQA national synthesis studies

- ~2,500 domestic & ~500 to1,000 public-supply wells
- Samples collected prior to treatment
- Samples analyzed for ~200 contaminants
  - Organic compounds – pesticides, VOCs
  - Inorganic compounds – nutrients, major ions, trace elements
- Results evaluated by:
  - Geographic patterns of occurrence
  - Land use

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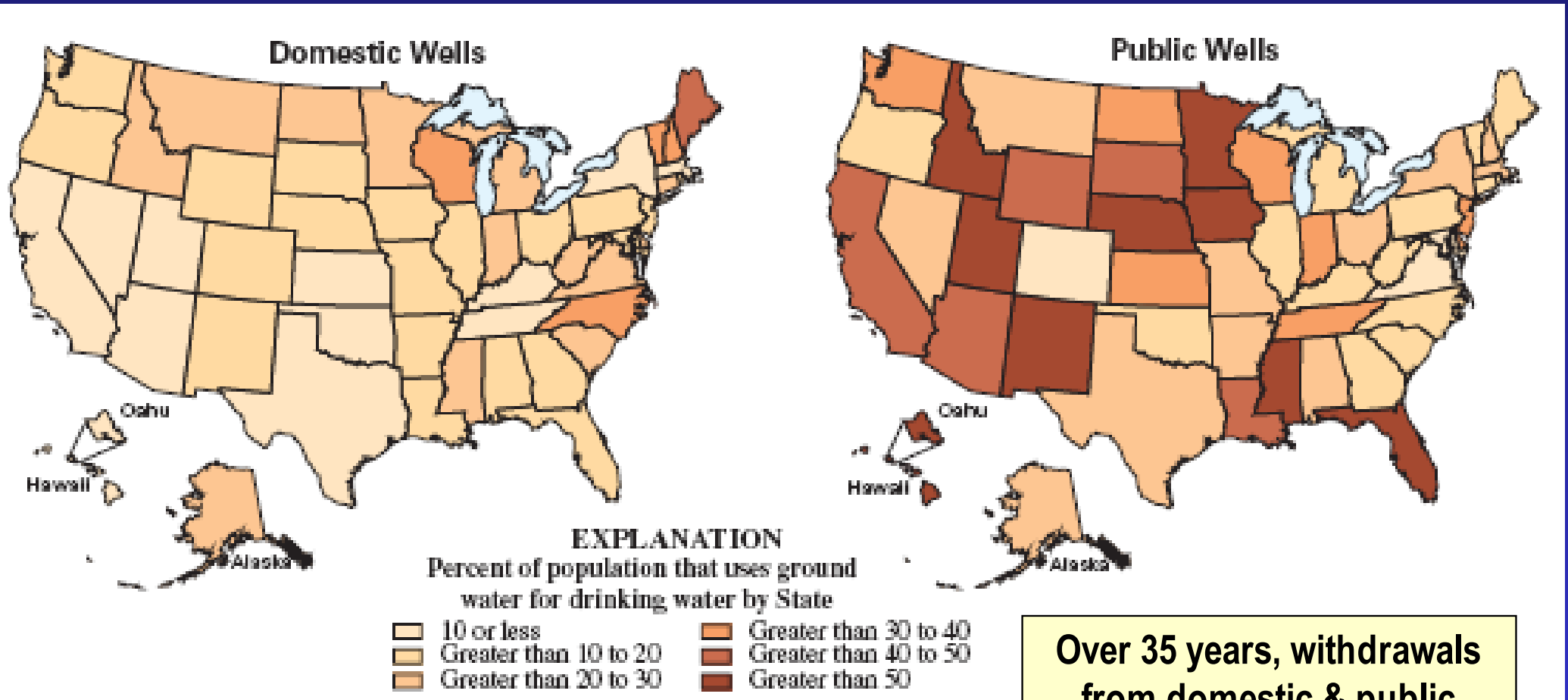
~150 million people in the U.S. receive drinking water from domestic & public wells



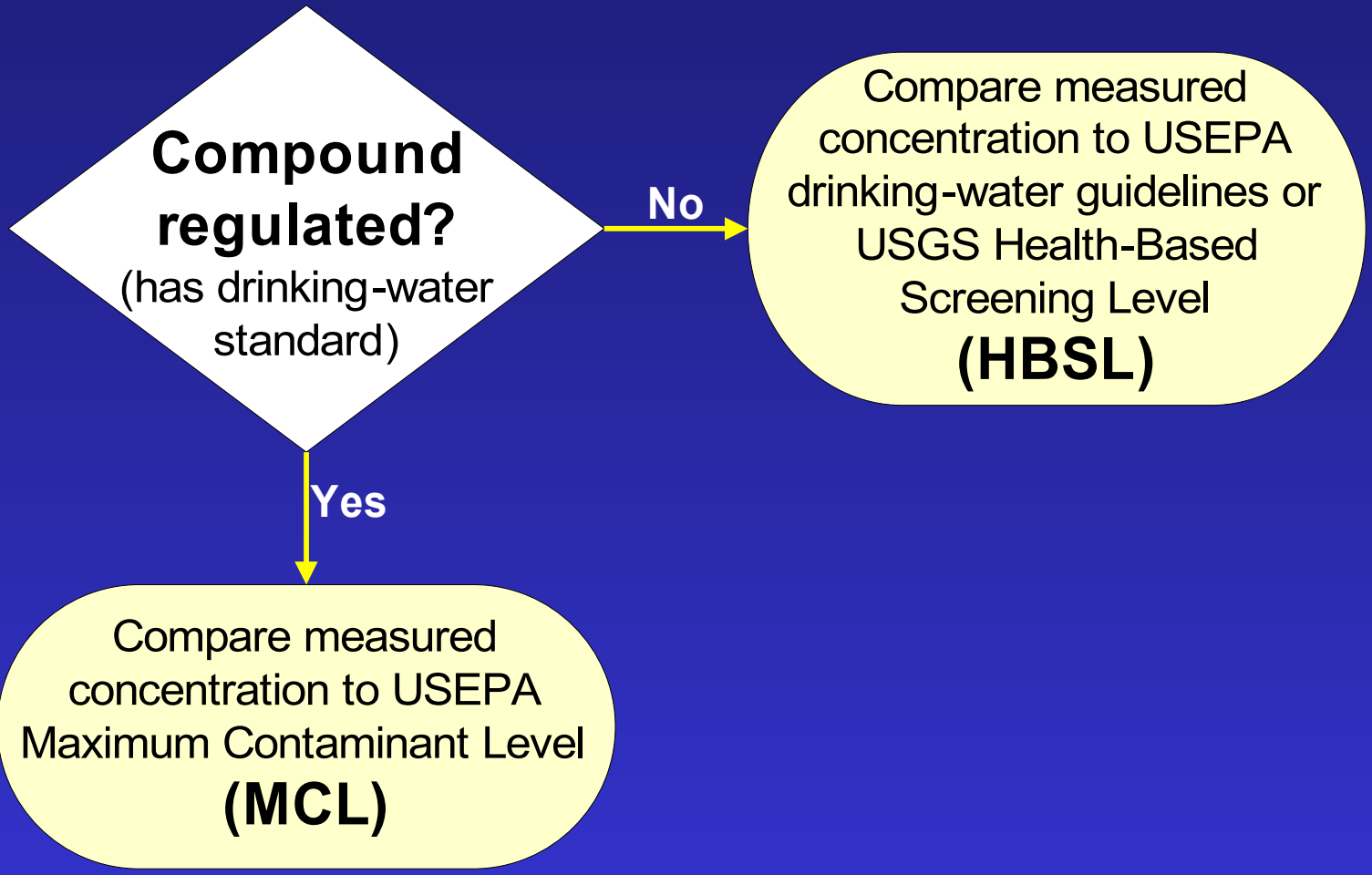
Over 35 years, withdrawals from domestic & public wells increased by ~60 & 100

Why is it important for NAWQA to assess findings in a health context?

- **Address stakeholders' requests to increase human-health relevancy of results**
- **Identify which compounds are important**
  - Which have concentrations of potential health concern?
  - Which occur most and least often?
  - Which are important for future monitoring?

What process was used to assess findings in a human-health context?

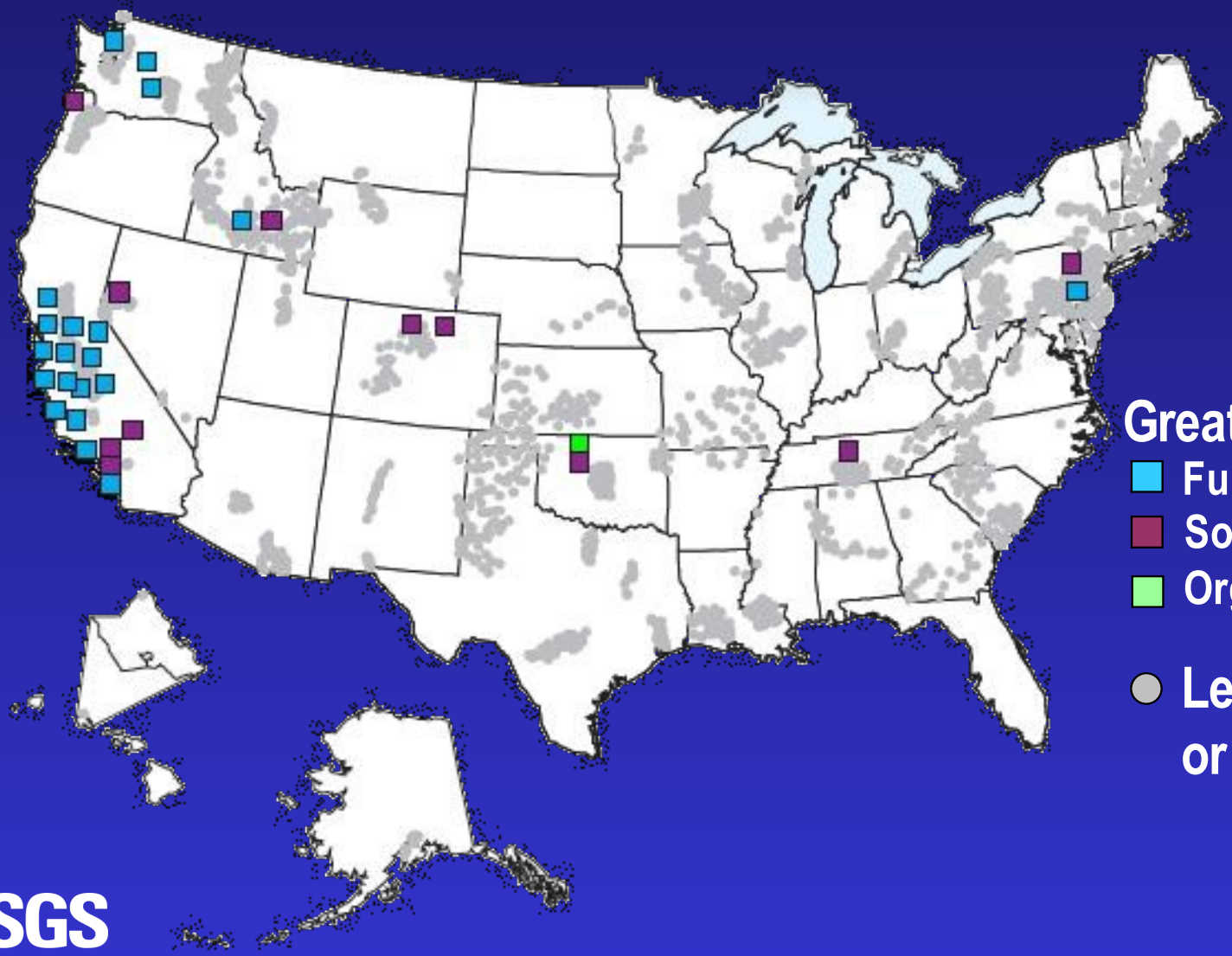
Screening-level assessment



Examples of national synthesis findings

- Fumigants in domestic wells
- MTBE in major aquifers
- Atrazine in major aquifers
- Arsenic in domestic wells

Most fumigant concentrations greater than MCLs in domestic wells were in California



Greater than benchmarks:
- Fumigant
- Solvent
- Organic synthesis compound

Less than benchmarks or not detected

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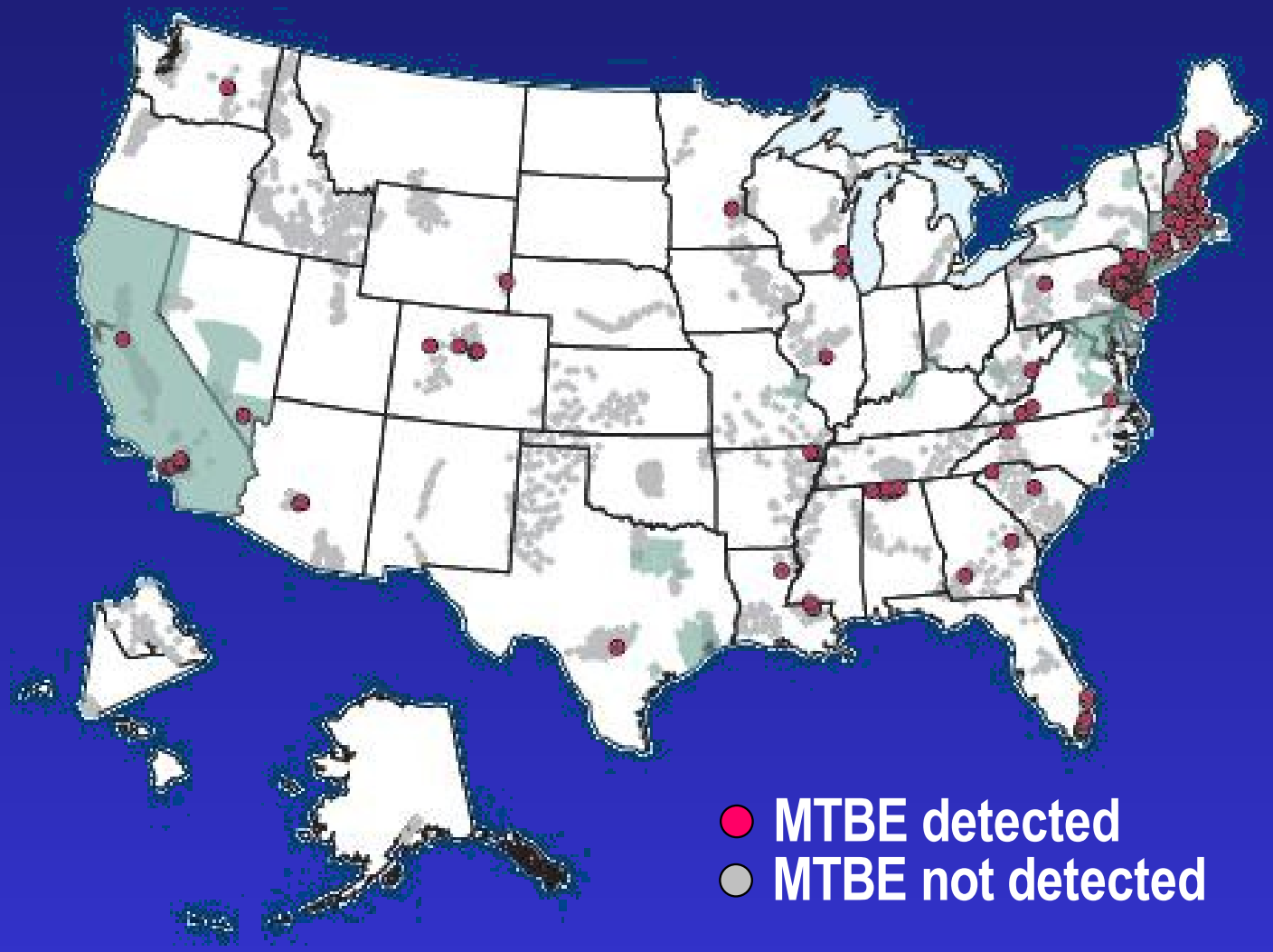
Most MTBE detections are in the highly populated New England & Mid-Atlantic States



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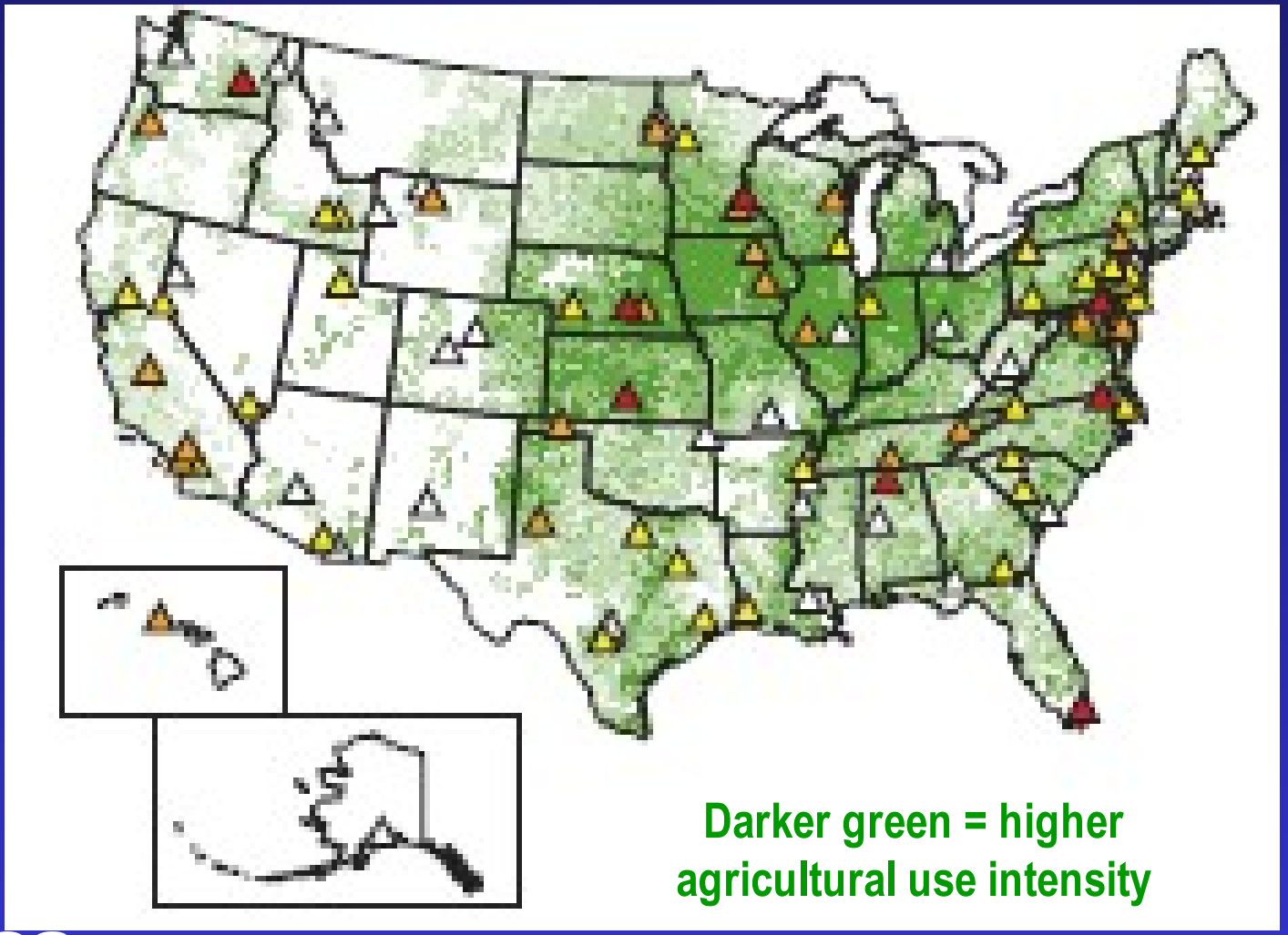
Atrazine was not always frequently detected in high agricultural use areas



- Not detected
- Detected < 10%
- 10 - 25%
- > 25%

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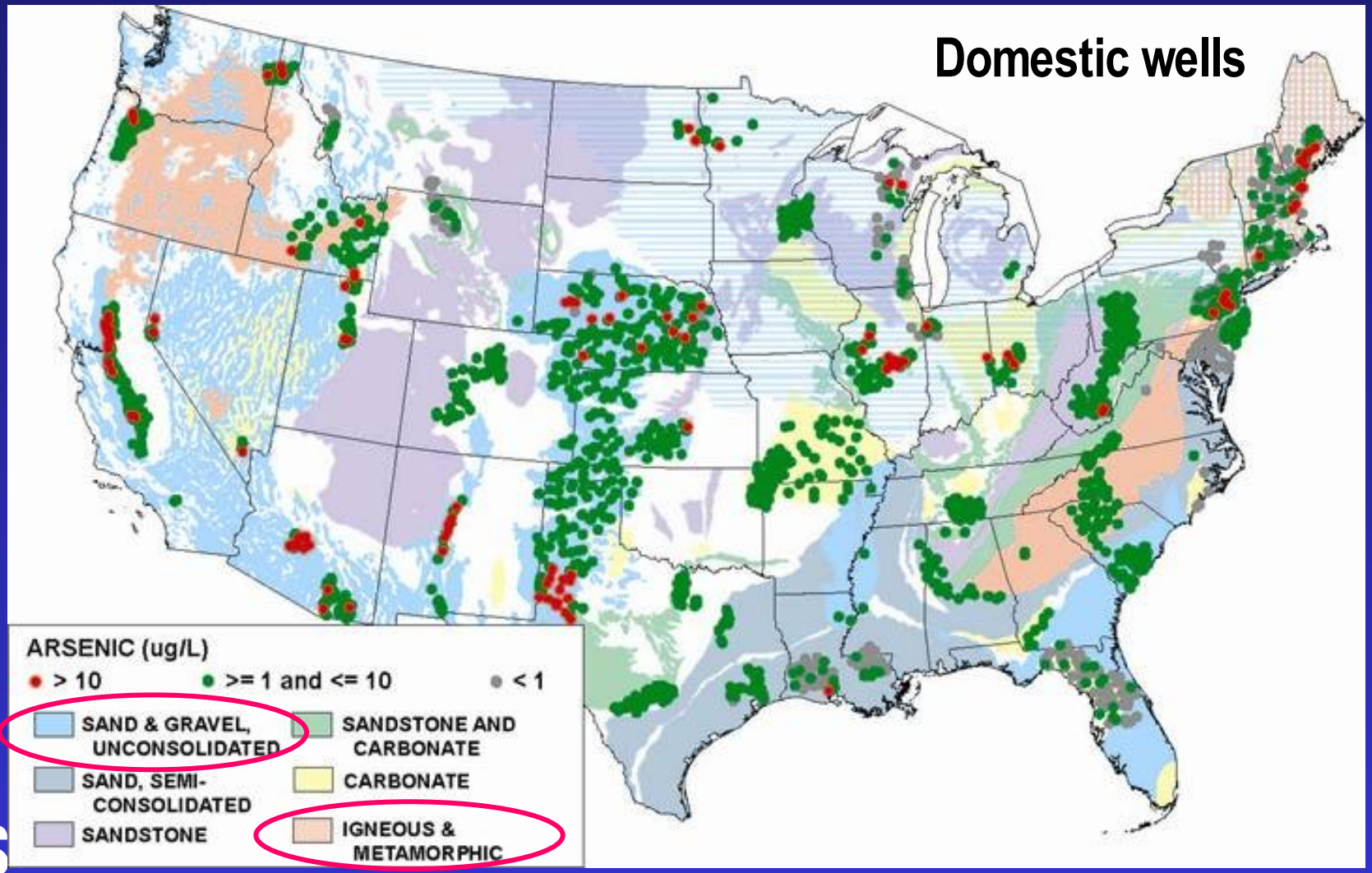
Arsenic concentrations were most often greater than MCLs in certain aquifer types



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Overall national synthesis findings

- Widespread contaminant occurrence
- Concentrations of organic compounds seldom of potential human-health concern
- National synthesis reveals occurrence patterns by hydrologic settings, land use, etc.
- Screening-level assessments are a first step for communicating findings in the context of human health

Parting thoughts...

- There appear to be considerable parallels in the goals and objectives NAWQA and EPHT.
- It's important to analyze environmental and human-health data at multiple spatial scales.
- It's essential to coordinate study designs & analyses.
- We look forward to potential collaboration opportunities.

More information

Patty Toccalino

916-278-3090

ptocca@usgs.gov

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